

METHODS OF FABRICATING NITRIDE-BASED TRANSISTORS HAVING REGROWN OHMIC CONTACT REGIONS AND NITRIDE-BASED TRANSISTORS HAVING REGROWN OHMIC CONTACT REGIONS

ABSTRACT OF THE DISCLOSURE

Transistor fabrication includes forming a nitride-based channel layer on a substrate, forming a barrier layer on the nitride-based channel layer, forming a contact recess in the barrier layer to expose a contact region of the nitride-based channel layer, forming a contact layer on the exposed contact region of the nitride-based channel layer, for example, using a low temperature deposition process, forming an ohmic contact on the contact layer and forming a gate contact disposed on the barrier layer adjacent the ohmic contact. A high electron mobility transistor (HEMT) and methods of fabricating a HEMT are also provided. The HEMT includes a nitride-based channel layer on a substrate, a barrier layer on the nitride-based channel layer, a contact recess in the barrier layer that extends into the channel layer, an n-type nitride-based semiconductor material contact region on the nitride-based channel layer in the contact recess, an ohmic contact on the nitride-based contact region and a gate contact disposed on the barrier layer adjacent the ohmic contact. The n-type nitride-based semiconductor material contact region and the nitride-based channel layer include a surface area enlargement structure.